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(56) Documents Cited
**GB 2276417 A GB 2164089 A GB 2127892 A
GB 0256983 A WO 95/08687 A1 US 4131969 A**

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(54) Improvements in hinge assemblies

(57) A hinge assembly, for use on cargo containers, which comprises a hinge leaf 1 adapted to be secured to a container door and pivotally attached to a frame 6 by means of a pin 3 carried from a mounting 2a, 2b on the frame 6. The leaf 1 and mounting 2a, 2b being provided with stop means 4, 5 which permit unrestricted movement of the door about the pivot pin 3, but which co-operate to prevent movement of the door about a distal parallel axis, e.g. that defined by a rod lock, if the pivot pin 3 is removed. The hinge assembly offers increased security when used with customs seals to secure the container doors together to prevent theft.

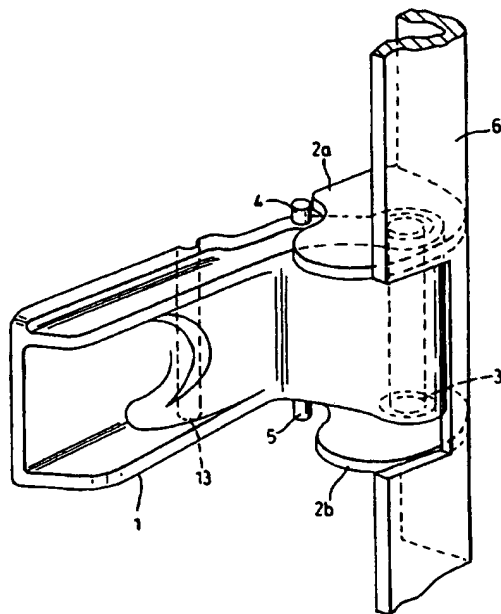


Fig. 1

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the formal requirements of the Patents Rules 1995

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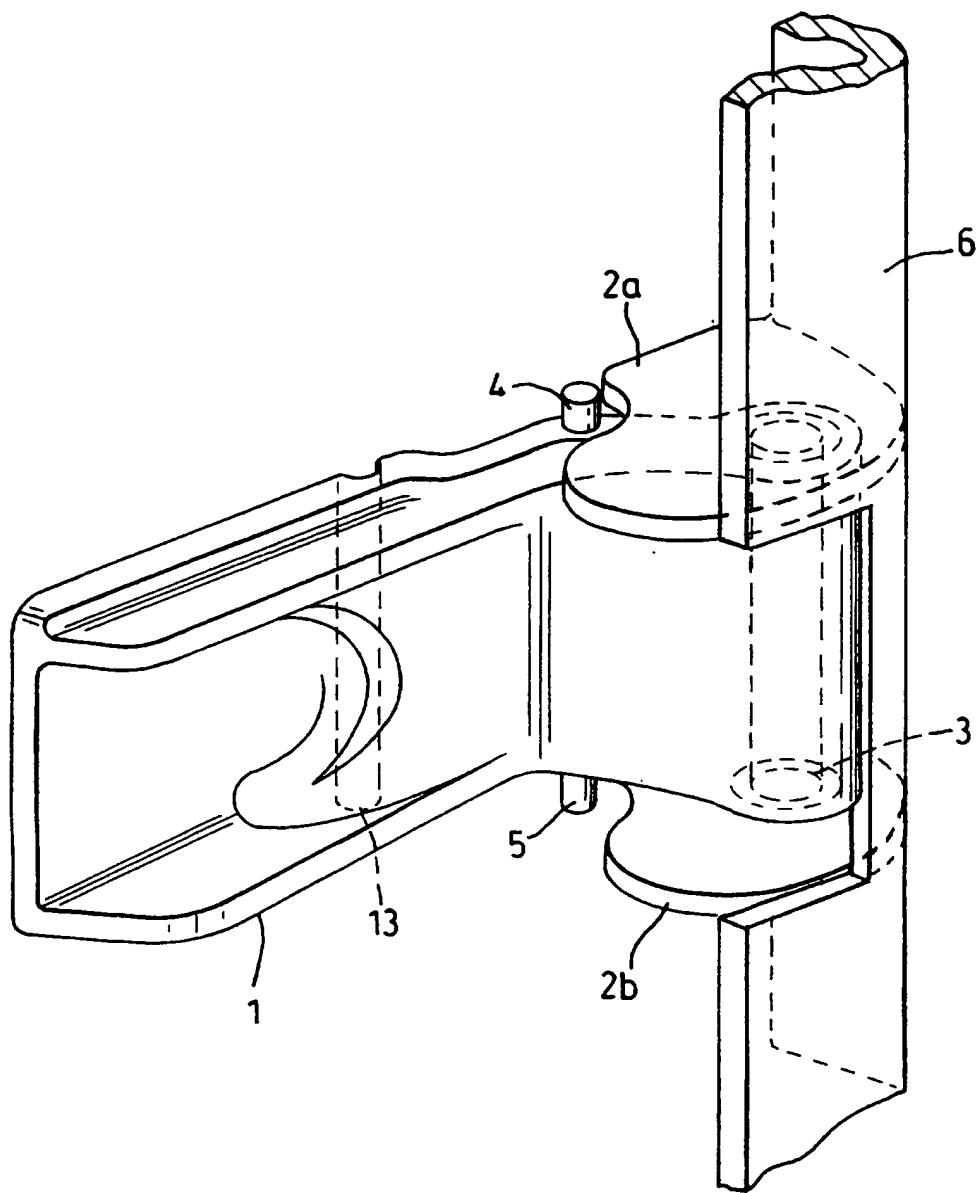


Fig. 1

Fig. 3

Fig. 3



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IMPROVEMENTS IN HINGE ASSEMBLIES

This invention relates to welded structures and components for use in such structures. In particular the invention is concerned with cargo
5 containers for use with the shipping and the construction of hinges for such cargo containers.

A common problem with the ever increasing use of cargo containers to store expensive, yet often readily disposable goods, is that
10 of theft by pilfering. In a typical example, the doors of a container are secured hingedly to a door frame by hinges which are welded in place. Each of the hinges typically comprises a hinge leaf which is welded to the container door skin, and is adapted to rotate about a hinge pin which is welded to a support means provided on a part of the door frame. In order
15 to prevent theft, it is well known to use customs' seals to secure the two doors of the container together at the lock rod handles and prevent unauthorised entry. Breaking of seals provides an indication that unauthorised entry has taken place.

20 Despite the use of customs seals, it has been known for unauthorised entry into containers to have taken place by the removal of the hinge pin from the hinges, whereafter the door can be pivoted open about the lock rod handles as an axis. This kind of theft does not damage the seals and often goes undetected. Since the doors can be re-closed and
25 the hinge pins replaced, signs of tampering can be cancelled by the use of a filler, and by paint spraying to simulate the welds.

According to our invention, in a hinge assembly for use in combination with containers hingedly to carry a door from a frame and
30 comprising a hinge leaf adapted to be secured to the door and hingedly

connected to the frame by means of a pivot pin carried from a mounting on the frame, the leaf and the mounting are provided with stop means which permit unrestricted movement of the door about the pivot pin as an axis after release of a rod lock, but which co-operate to prevent movement of the door about the rod lock as an axis following removal of the pivot pin.

Conveniently the stop means comprises a projection carried by the leaf for co-operation with a stop face on the mounting to prevent movement of the door about the rod lock as an axis.

Preferably a hinge leaf has a transverse bore provided at a first end and a mounting portion provided at the other end which is adapted to be secured to a skin of a door of the container, the mounting comprises a hinge support means adapted to be secured to a portion of a door frame of the container, the support means comprising a spaced apart upper and lower support butt, being spaced apart so as to accommodate the first end of the hinge leaf therebetween, the pivot pin is adapted to extend through the transverse bore in the hinge leaf to co-operate with the upper and lower support surfaces so that in use the door can be moved between a first closed position and a second open position by rotation of the hinge leaf about the pivot pin in the transverse bore in the hinge leaf, and the stop means are provided on the hinge leaf, the stop means being adapted to co-operate with a portion of at least one of the upper and lower support butts to limit movement of at least the end of the hinge leaf containing the transverse bore in a direction substantially at a normal to the door frame of the container in the event that the pivot pin removed from the bore.

The doors of the container can not therefore readily be opened by removing the hinge pins and rotating about the door latch handles (or any other form of movement which results in movement of the portion of the hinge containing the bore in a direction substantially perpendicular to the door frame). If such a movement is attempted, the stop means engages at least one of the support butts to prevent opening.

The stop means may comprise an upper and a lower protruding lug provided on a respective upper and lower edge of the hinge leaf. However only a single lug (i.e. one upper or one lower lug) may be provided. The upper and lower lugs may be adapted to co-operate with the outer profile of the respective upper and lower support butt if entry to the container is attempted by removal of the pivot pin. The lugs may be adapted so that in normal use of the hinge the stop means does not contact the support means and so does not impede operation of the hinge assembly.

Preferably, the support butts comprise separate upper and lower members which may be welded in place onto the door frame corner post. Alternatively, the support butts may comprise the upper and lower projections of a one-piece hinge bracket. This can prove advantageous as it enables accurate alignment between the upper and lower members prior to fastening to the door frame.

The support butts may comprise substantially planar metal elements which have an edge profile that is tailored to co-operate with the stop means provided on the leaf. This is advantageous as the resulting butts are substantially two-dimensional and are easy and relatively inexpensive to manufacture.

There will now be described by way of example only, an embodiment of the invention with reference to the accompanying drawings in which:

5 **Figure 1** is a perspective view of a hinge assembly in accordance with the invention as attached to a corner post of a container;

10 **Figure 2** is a view of the hinge assembly attached to a door of a container and in the closed position as viewed from directly below the hinge assembly;

Figure 3 is a view of the hinge assembly of **Figure 2** as viewed from the front of the door; and

15 **Figure 4** is the same view as **Figure 2** but shows the door in a fully closed 14, partly open first position 15 and more fully open position 16.

20 In the hinge illustrated in the accompanying drawings, a hinge leaf 1 comprises a metal forging or casting of stepped outline. The leaf 1 is provided at one end with a transverse bore 9 to receive a pivot pin 3 by means of which the leaf 1 is pivotally connected to an upper and lower hinge butt 2a,2b which are in turn connected to a corner rail 6 of the container door frame 7. A planar portion 17 of the leaf 1, which
25 terminates at the opposite end to the transverse bore 2, is secured to the skin of a cargo door 8 by a continuous weld (not shown). Typically, several such hinges will be provided for a single door (i.e. at the top, middle and bottom of the door).

Optionally, a recess 13 transverse the leaf 1 is provided at the inner end of the planar portion 17 on the side of the interface of the leaf 1 and the door 8. The recess 13 may be filled with sealant to form a water resistant barrier across the leaf. Such a recess is known from our earlier
5 Patent GB-B1-2 260 508

An upper and a lower stop means 4,5 in the form of a pair of lugs is provided on the hinge leaf between the transverse bore 9 and the inner end of the transverse portion 17. The lugs protrude away from the upper
10 and lower edges respectively of the hinge leaf when viewed from the front of the door to which the hinge is secured. Each lug is adapted to co-operate with a respective one of the upper or lower support butts to prevent relative movement of the end of the hinge leaf containing the transverse bore away from the door frame when the hinge pins are
15 removed (i.e. movement of the hinge substantially at a normal to the door opening). However, the upper and lower lugs are positioned so that normal opening of the door by rotating the hinge leaf about the hinge pin is not restricted.

20 Thus even if the hinge pins are removed, the door can not be swung open around the door retainer handles or any other point distal from the hinge but, because movement is limited by engagement between the upper and lower lugs and the support butts. Furthermore, because both an upper and lower stop means is provided, it is not possible to lift
25 the hinge leaf slightly relative to the lower support butt in order to clear the support butt.

The normal operation of the door between a closed position 14(as shown in solid lines in Figures 1,2 and 3), and two partially open
30 positions 15 and 16 (shown in broken lines) is shown in Figure 4.

As the hinge leaf is pivoted about the hinge pin, the stop lugs 4,5 rotate about the hinge pin along the line y-y' as shown. The lugs therefore do not co-operate with the support butts during such normal use of the hinge, and so door operation is not impaired.

However, as shown in Figure 3, any attempt to open the door by removing the hinge pin from the hinge and attempting to move the hinge relatively away from the door frame (so that the stop means moves along the line x-x') as occurs during illegal entry, is thwarted as the lugs 4,5 co-operate with the support butts 2a,2b.

CLAIMS

1. A hinge assembly for use in combination with containers hingedly to carry a door from a frame and comprising a hinge leaf adapted to be secured to the door and hingedly connected to the frame by means of a pivot pin carried from a mounting on the frame, the leaf and the mounting are provided with stop means which permit unrestricted movement of the door about the pivot pin as an axis after release of a rod lock, but which co-operate to prevent movement of the door about the rod lock as an axis following removal of the pivot pin.
2. A hinge assembly according to claim 1 in which the stop means comprises a projection carried by the leaf for co-operation with a stop face on the mounting to prevent movement of the door about the rod lock as an axis.
3. A hinge assembly according to claim 1 or claim 2 comprising:
a hinge leaf having a transverse bore provided at a first end and a mounting portion provided at the other end which is adapted to be secured to a skin of a door of the container;
the mounting comprises a hinge support means adapted to be secured to a portion of a door frame of the container, the support means comprising a spaced apart upper and lower support butt, being spaced apart so as to accommodate the first end of the hinge leaf therebetween;
and
the pivot pin is adapted to extend through the transverse bore in the hinge leaf to co-operate with the upper and lower support surfaces so that in use the door can be moved between a first closed position and a second open position by rotation of the hinge leaf about the pivot pin in the transverse bore in the hinge leaf,

and the stop means are provided on the hinge leaf, the stop means being adapted to co-operate with a portion of at least one of the upper and lower support butts to limit movement of at least the end of the hinge leaf containing the transverse bore in a direction substantially at a normal to the door frame of the container in the event that the pivot pin is removed from the bore.

4. A hinge assembly according to claim 3 in which the stop means comprises an upper and a lower protruding lug provided on a respective upper and lower edge of the hinge leaf.

5. A hinge assembly according to claim 4 in which the upper and lower lugs are adapted to co-operate with the outer profile of the respective upper and lower support butts.

6. A hinge assembly according to any one of claims 3 to 5 in which the support butts comprise separate upper and lower members welded in place onto the door frame corner post.

7. A hinge assembly according to any one of claims 3 to 5 in which the support butts comprise the upper and lower projections of a one-piece hinge bracket.

8. A hinge assembly according to any one of claims 3 to 7 in which the support butts comprise substantially planar metal elements.

9. A hinge assembly substantially as described herein with reference to and as illustrated in the accompanying drawings.



Application No: GB 9625387.7
Claims searched: 1-9

Examiner: E.L.Rendle
Date of search: 30 January 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK CI (Ed.O): E2F (FAA, FAG, FCE, FCK, FCL, FCN, FCX, FPX)

Int CI (Ed.6): E05D 3/02 5/10 11/00

Other: Online: WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2 276 417 A (GEVAUX) see figure and page 1 lines 14-21.	1, 2
X	GB 2 164 089 A (SPHINX) see figures 3 and 4 and page 2 lines 12-20.	1, 2
X	GB 2 127 892 A (WORCESTER) see figure and page 1 lines 13-24.	1, 2
X	GB 0 256 983 (LEVY) see figures 6 and 7, page 1 lines 43-53 and page 2 lines 10-25.	1, 2
X	WO 95/08687 A1 (NICO) see figures and page 2 lines 19-29.	1, 2
X	US 4 131 969 (SUSKA) see figures 1, 2 and 3 and column 1 lines 40-49.	1, 2

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